

Appendix D

Duty Cycle

Condition	Mode	Frequency (MHz)	Antenna	On Time (ms)	Period (ms)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)	Final settingFor VBW (kHz)
NVNT	BLE 1M	2402	Ant1	0.4	0.63	63.49	1.97	2.53	1
NVNT	BLE 1M	2440	Ant1	0.4	0.63	63.49	1.97	2.53	1
NVNT	BLE 1M	2480	Ant1	0.39	0.63	61.9	2.08	2.53	1
NVNT	BLE 2M	2402	Ant1	0.21	0.63	33.33	4.77	4.77	1
NVNT	BLE 2M	2440	Ant1	0.21	0.63	33.33	4.77	4.77	1
NVNT	BLE 2M	2480	Ant1	0.21	0.63	33.33	4.77	4.77	1

Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	E.I.R.P (dBm)	E.I.R.P Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	6.44	0	6.44	30	8.22	<=36.02	Pass
NVNT	BLE 1M	2440	Ant1	5.79	0	5.79	30	7.57	<=36.02	Pass
NVNT	BLE 1M	2480	Ant1	6.43	0	6.43	30	8.21	<=36.02	Pass
NVNT	BLE 2M	2402	Ant1	6.51	0	6.51	30	8.29	<=36.02	Pass
NVNT	BLE 2M	2440	Ant1	5.94	0	5.94	30	7.72	<=36.02	Pass
NVNT	BLE 2M	2480	Ant1	6.54	0	6.54	30	8.32	<=36.02	Pass
Note1: Antenna Gain: 1.78dBi;										
Note2: E.I.R.P = Measured Power + Antenna Gain										

Test Graphs

Power NVNT BLE 1M 2402MHz Ant1



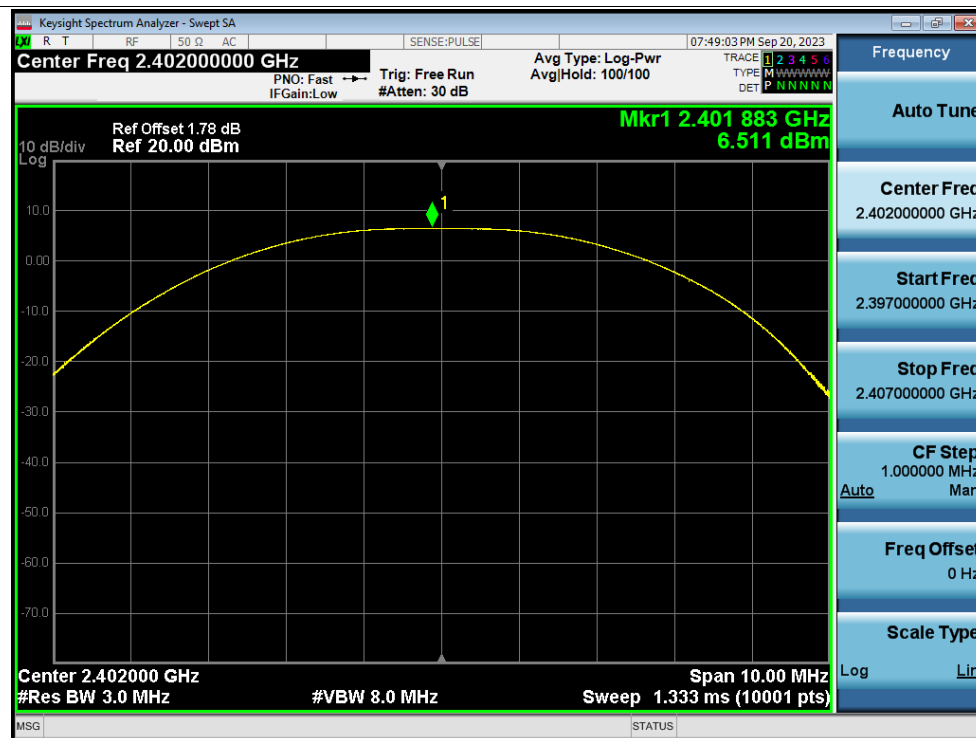
Power NVNT BLE 1M 2440MHz Ant1



Power NVNT BLE 1M 2480MHz Ant1



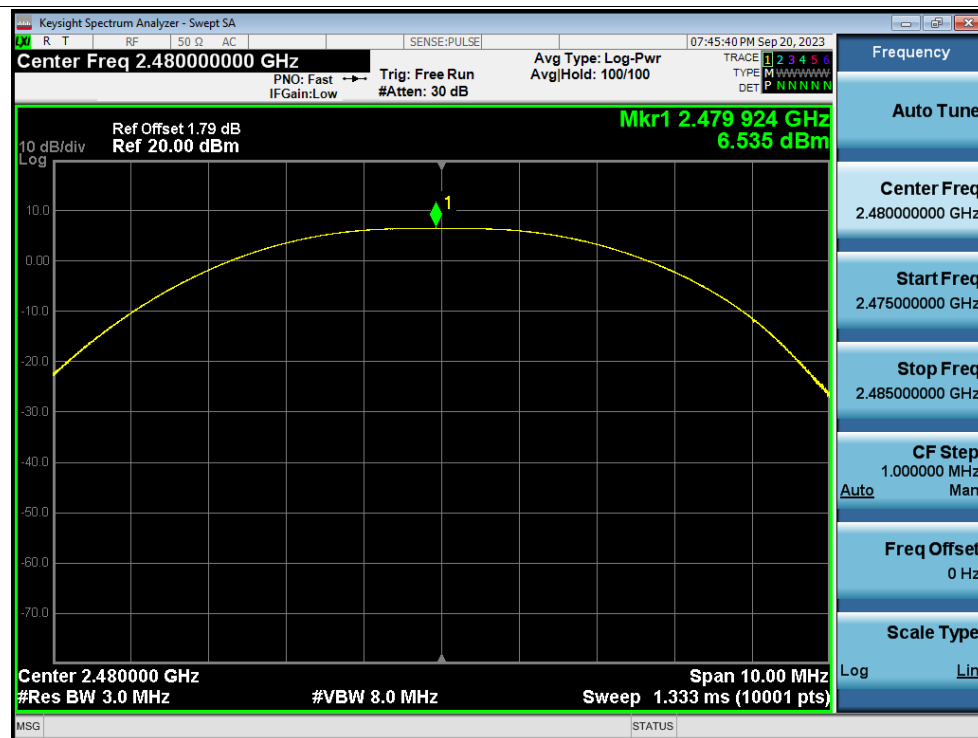
Power NVNT BLE 2M 2402MHz Ant1



Power NVNT BLE 2M 2440MHz Ant1



Power NVNT BLE 2M 2480MHz Ant1



-6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	0.653	0.5	Pass
NVNT	BLE 1M	2440	Ant1	0.653	0.5	Pass
NVNT	BLE 1M	2480	Ant1	0.643	0.5	Pass
NVNT	BLE 2M	2402	Ant1	1.068	0.5	Pass
NVNT	BLE 2M	2440	Ant1	0.941	0.5	Pass
NVNT	BLE 2M	2480	Ant1	1.097	0.5	Pass

Test Graphs

-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



-6dB Bandwidth NVNT BLE 1M 2440MHz Ant1



-6dB Bandwidth NVNT BLE 1M 2480MHz Ant1



-6dB Bandwidth NVNT BLE 2M 2402MHz Ant1



-6dB Bandwidth NVNT BLE 2M 2440MHz Ant1



-6dB Bandwidth NVNT BLE 2M 2480MHz Ant1



Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	BLE 1M	2402	Ant1	1.027
NVNT	BLE 1M	2440	Ant1	1.035
NVNT	BLE 1M	2480	Ant1	1.034
NVNT	BLE 2M	2402	Ant1	2.037
NVNT	BLE 2M	2440	Ant1	2.05
NVNT	BLE 2M	2480	Ant1	2.017

Test Graphs

OBW NVNT BLE 1M 2402MHz Ant1



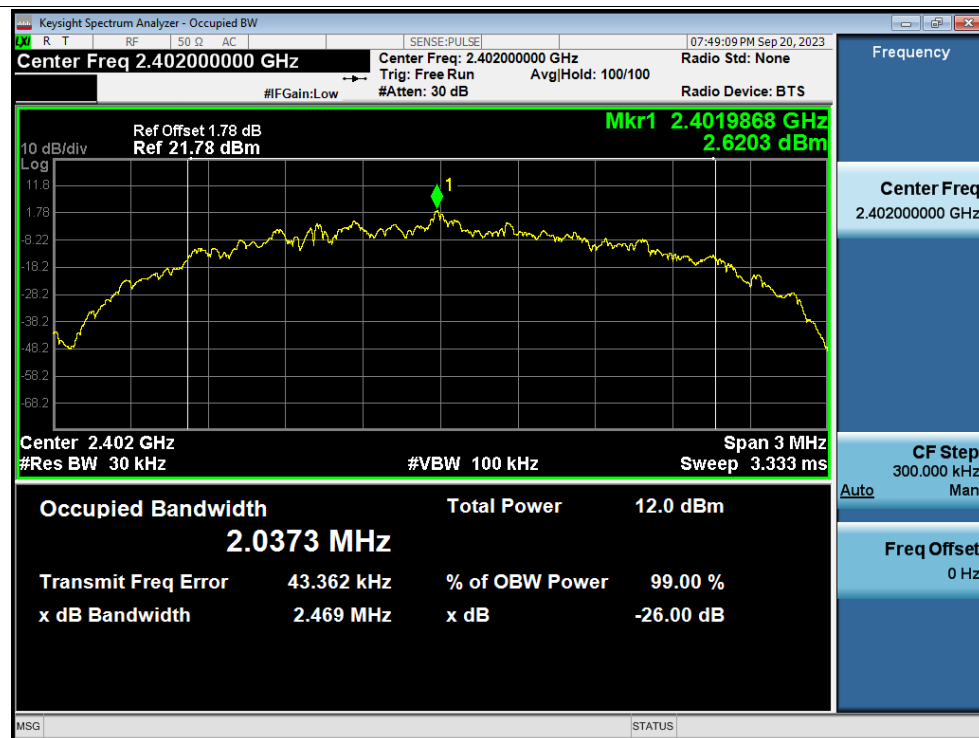
OBW NVNT BLE 1M 2440MHz Ant1



OBW NVNT BLE 1M 2480MHz Ant1



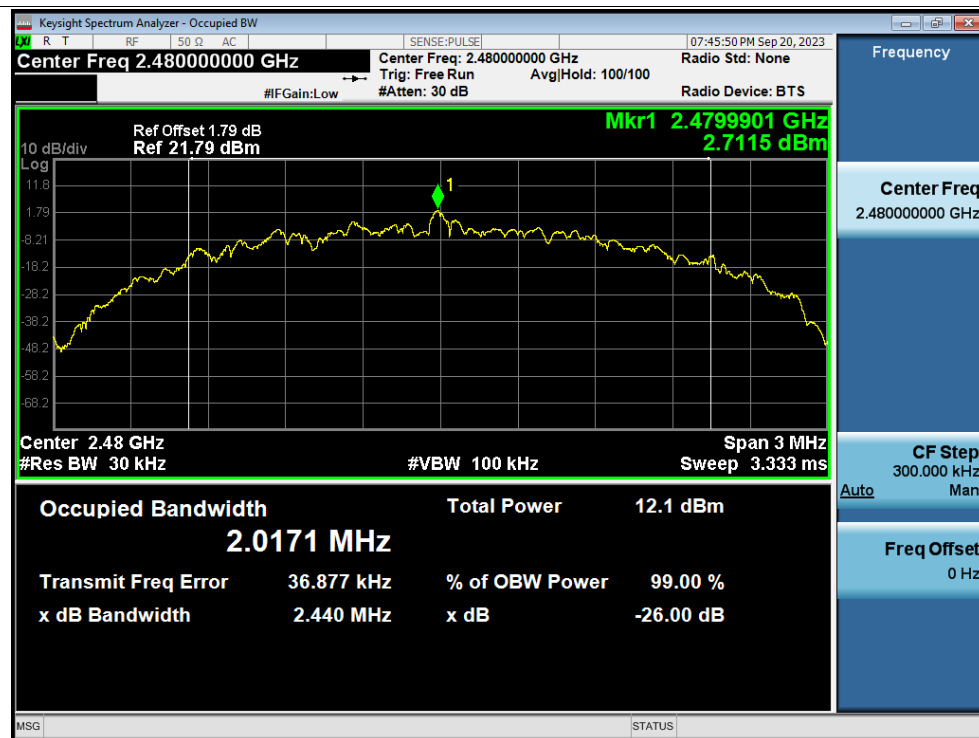
OBW NVNT BLE 2M 2402MHz Ant1



OBW NVNT BLE 2M 2440MHz Ant1



OBW NVNT BLE 2M 2480MHz Ant1

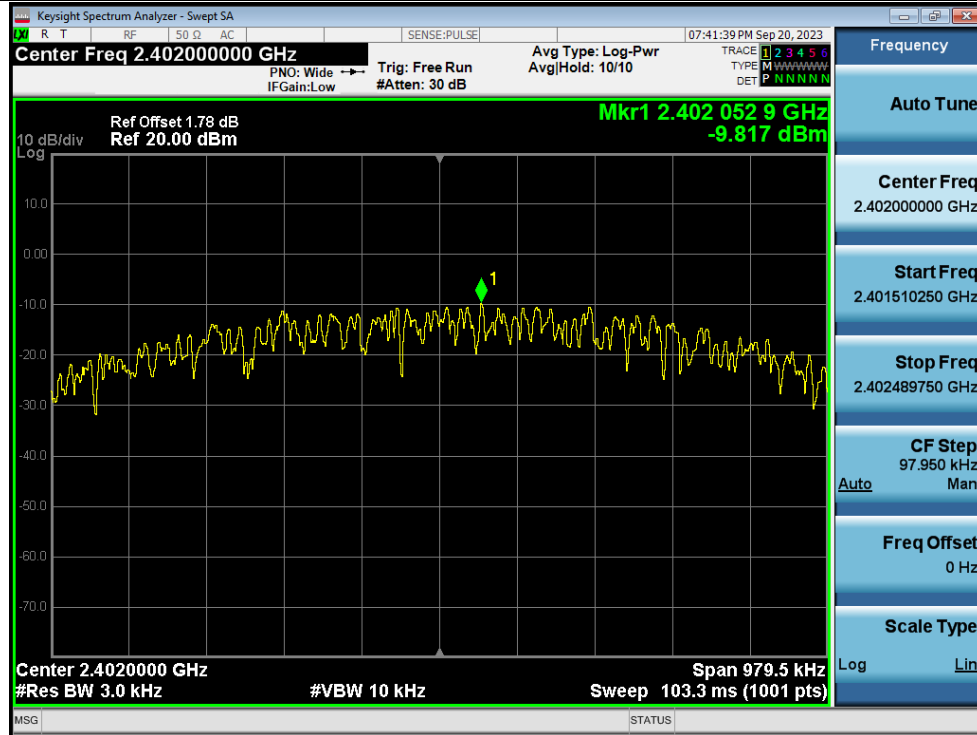


Maximum Power Spectral Density Level

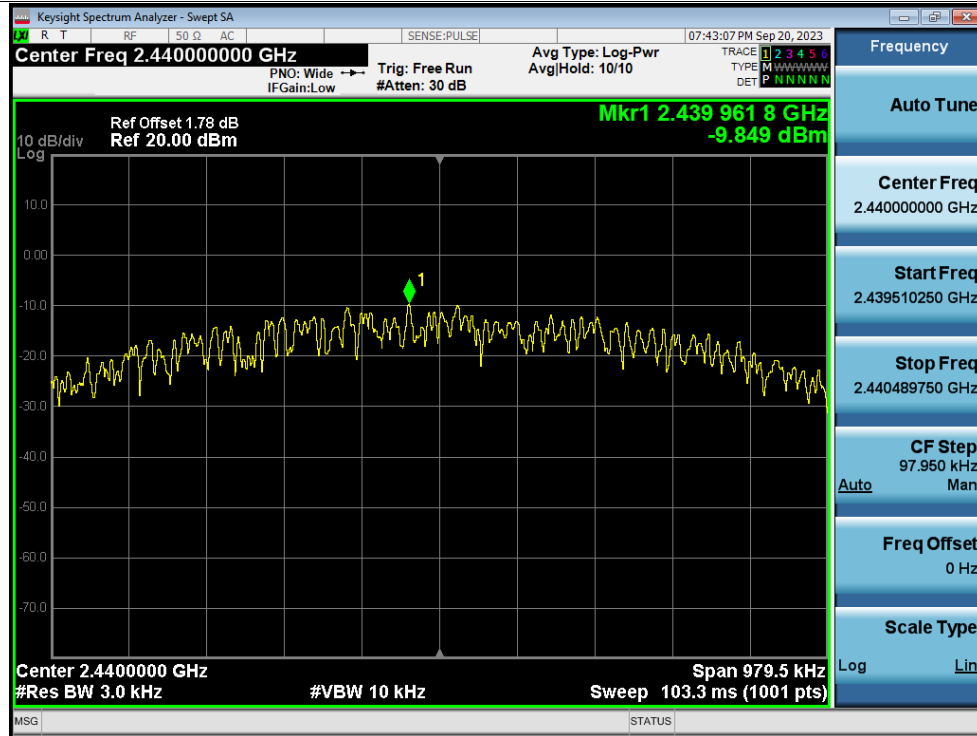
Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Duty Factor (dB)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	BLE 1M	2402	Ant1	-9.82	0	-9.82	8	Pass
NVNT	BLE 1M	2440	Ant1	-9.85	0	-9.85	8	Pass
NVNT	BLE 1M	2480	Ant1	-9.06	0	-9.06	8	Pass
NVNT	BLE 2M	2402	Ant1	-9.49	0	-9.49	8	Pass
NVNT	BLE 2M	2440	Ant1	-11.47	0	-11.47	8	Pass
NVNT	BLE 2M	2480	Ant1	-11.89	0	-11.89	8	Pass

Test Graphs

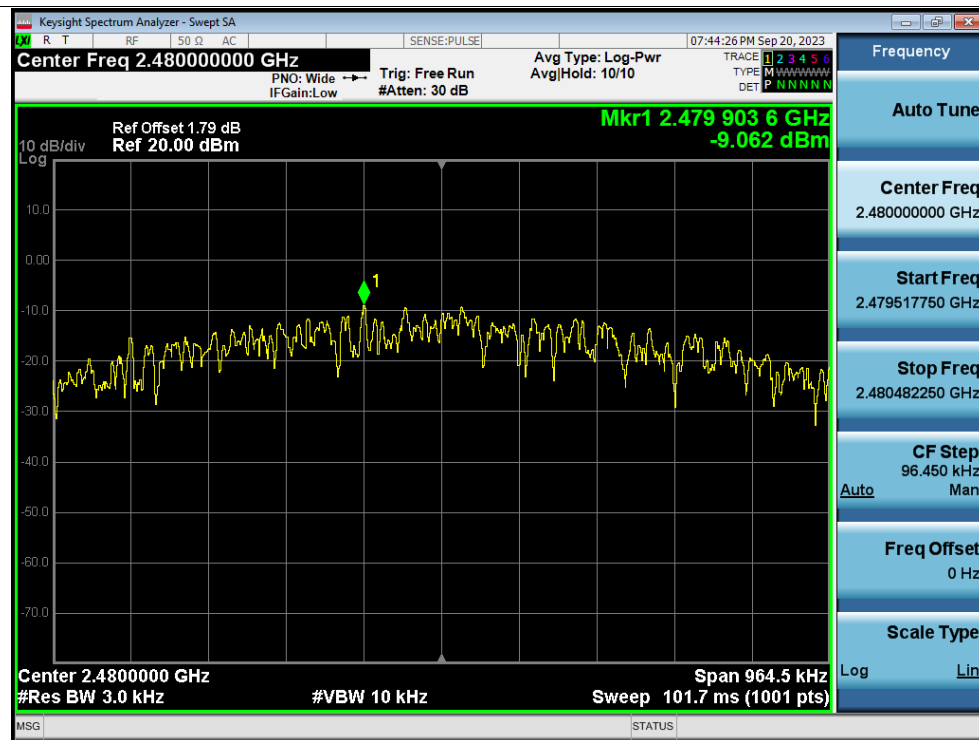
PSD NVNT BLE 1M 2402MHz Ant1



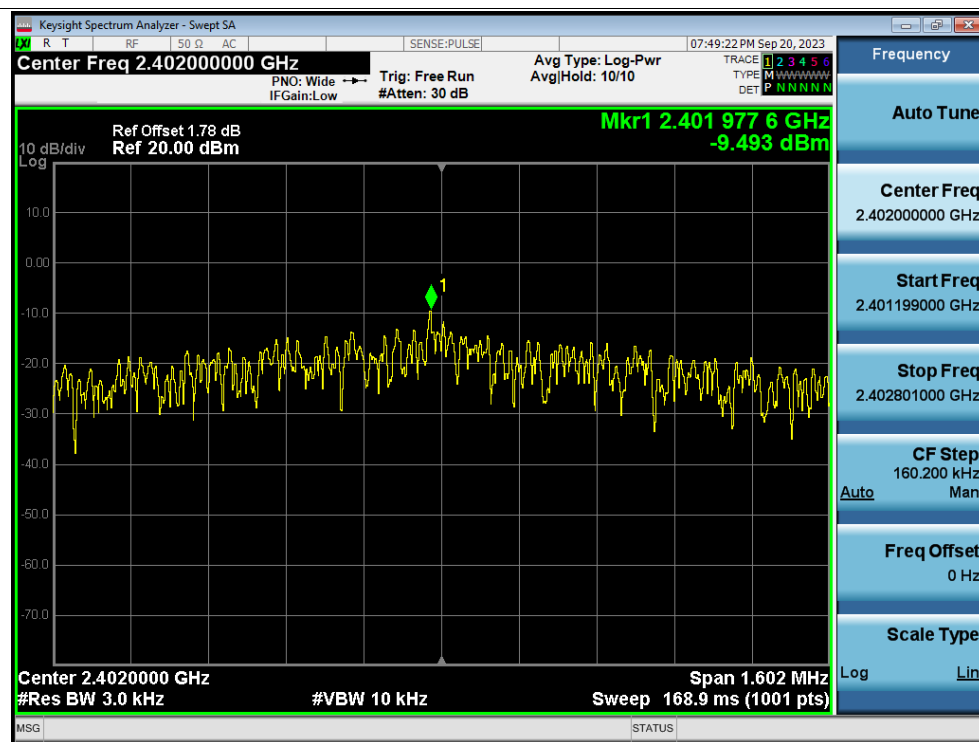
PSD NVNT BLE 1M 2440MHz Ant1



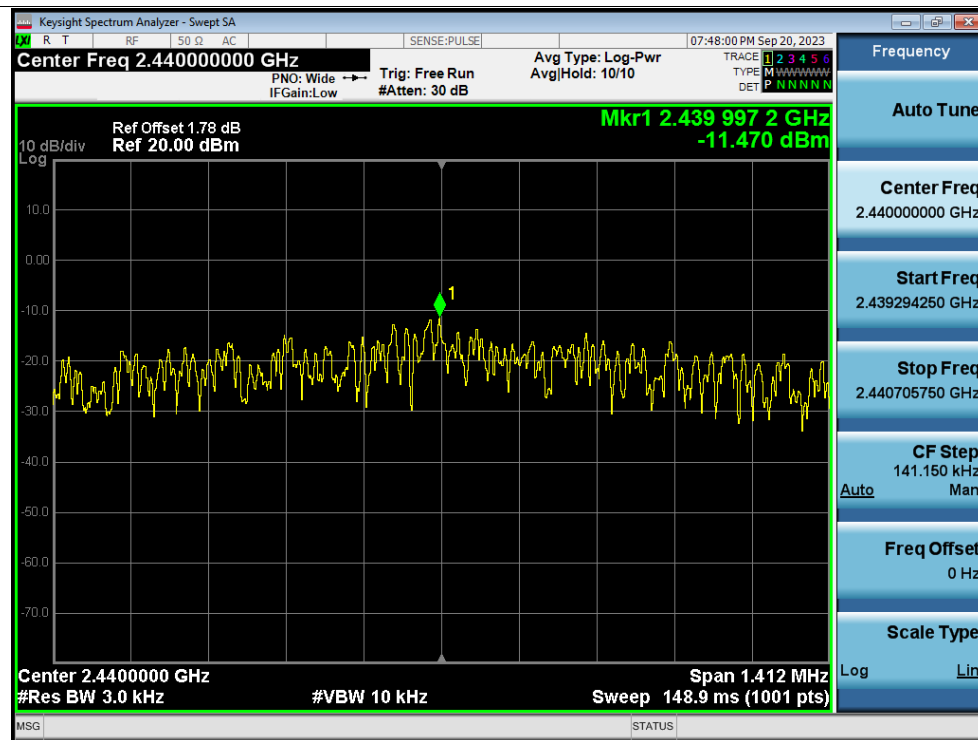
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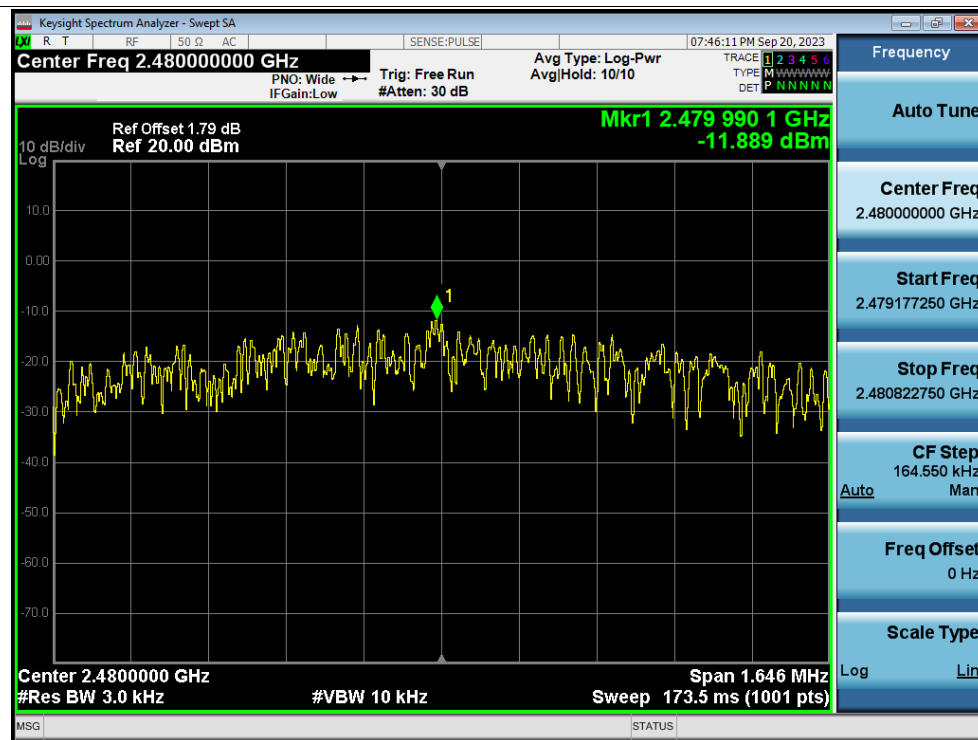
PSD NVNT BLE 2M 2402MHz Ant1



PSD NVNT BLE 2M 2440MHz Ant1



PSD NVNT BLE 2M 2480MHz Ant1



Band Edge

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-59.9	-20	Pass
NVNT	BLE 1M	2480	Ant1	-63.79	-20	Pass
NVNT	BLE 2M	2402	Ant1	-32.85	-20	Pass
NVNT	BLE 2M	2480	Ant1	-59.78	-20	Pass

Test Graphs

Band Edge NVNT BLE 1M 2402MHz Ant1 Ref
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Keysight Spectrum Analyzer - Swept SA



Keysight Spectrum Analyzer - Swept SA

Center Freq 2.48000000 GHz

Ref Offset 1.79 dB
Ref 20.00 dBm

Trig: Free Run
#Atten: 30 dB

Avg Type: Log-Pwr
Avg/Hold: 100/100

Frequency

Auto Tune

Center Freq
2.48000000 GHz

Start Freq
2.476000000 GHz

Stop Freq
2.484000000 GHz

CF Step
800.000 kHz
Man

Freq Offset
0 Hz

Scale Type
Log

10 dB/div
Log

Mkr1 2.480 024 GHz
6.317 dBm

Center 2.480000 GHz
#Res BW 100 kHz
#VBW 300 kHz

Span 8.000 MHz
Sweep 1.000 ms (1001 pts)

The image shows a Keysight Spectrum Analyzer interface. The main display area shows a spectrum plot with a yellow trace. A peak is marked with a green diamond and labeled '1'. The peak is at 2.480024 GHz with a power of 6.317 dBm. The plot has a logarithmic scale. The y-axis is labeled '10 dB/div Log' and ranges from -70.0 to 10.0. The x-axis is labeled 'Center 2.480000 GHz' and 'Span 8.000 MHz'. The resolution bandwidth is 100 kHz and the video bandwidth is 300 kHz. The sweep time is 1.000 ms (1001 pts). The reference level is 20.00 dBm and the reference offset is 1.79 dB. The trigger is set to 'Free Run' and the attenuation is 30 dB. The average type is 'Log-Pwr' and the average/hold is 100/100. The frequency settings are: Center Freq 2.48000000 GHz, Start Freq 2.476000000 GHz, Stop Freq 2.484000000 GHz, CF Step 800.000 kHz (Manual), Freq Offset 0 Hz, and Scale Type Log. The top status bar shows 'Keysight Spectrum Analyzer - Swept SA', 'R T RE 50 Q AC', 'SENSE:PULSE', '07:44:30 PM Sep 20, 2023', and 'TRACE 1 2 3 4 5 6'. The bottom status bar shows 'MSG' and 'STATUS'.

Keysight Spectrum Analyzer - Swept SA

R T RF 50 Ω AC SENSE:PULSE 07:44:34 PM Sep 20, 2023

Center Freq 2.526000000 GHz

PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB Avg Type: Log-Pwr Avg/Hold: 100/100

TRACE 1 2 3 4 5 6
TYPE M W N N N N N N
DET P N N N N N N N

Ref Offset 1.79 dB Ref 20.00 dBm

Mkr1 2.480 0 GHz 6.270 dBm

10 dB/div Log

Start 2.47600 GHz Stop 2.57600 GHz
#Res BW 100 kHz #VBW 300 kHz Sweep 9.600 ms (1001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.480 0 GHz	6.270 dBm			
2	N	1	f	2.483 5 GHz	-59.862 dBm			
3	N	1	f	2.500 0 GHz	-60.699 dBm			
4	N	1	f	2.488 4 GHz	-57.470 dBm			
5								
6								
7								
8								
9								
10								
11								

MSG STATUS

Frequency

Auto Tune

Center Freq 2.526000000 GHz

Start Freq 2.476000000 GHz

Stop Freq 2.576000000 GHz

CF Step 10.000000 MHz Man

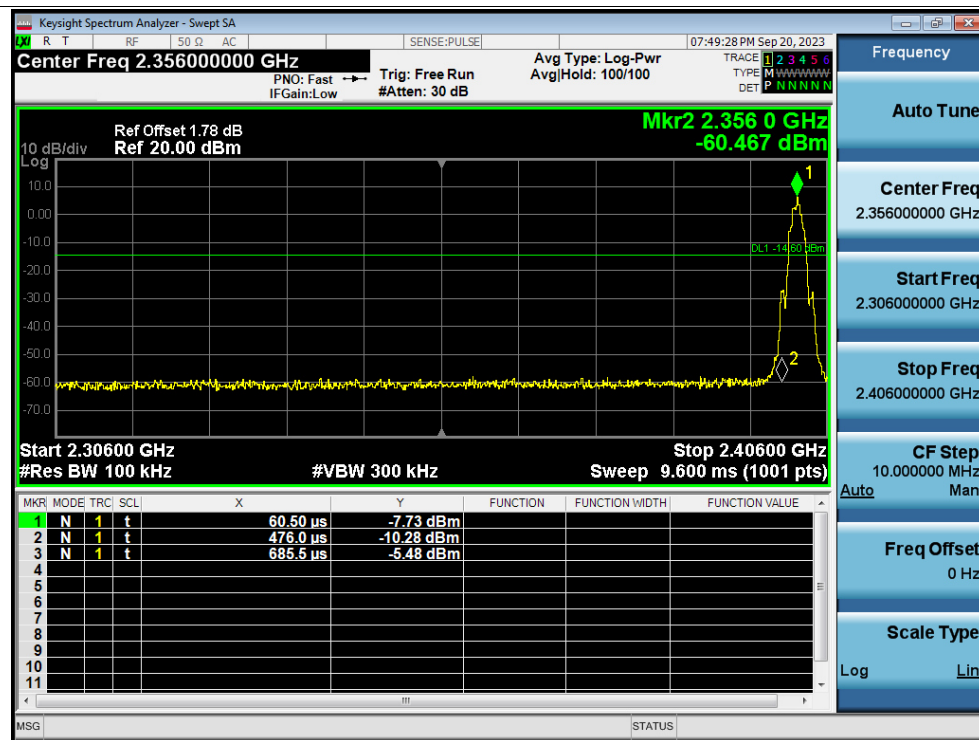
Freq Offset 0 Hz

Scale Type Log Lin

Band Edge NVNT BLE 2M 2402MHz Ant1 Ref



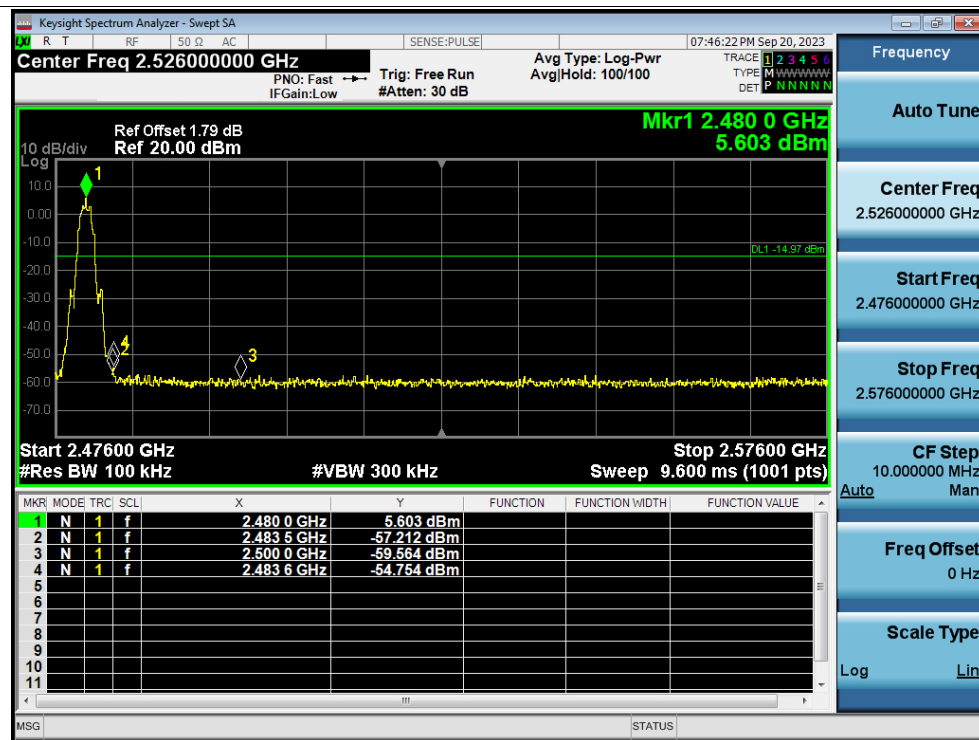
Band Edge NVNT BLE 2M 2402MHz Ant1 Emission



Band Edge NVNT BLE 2M 2480MHz Ant1 Ref



Band Edge NVNT BLE 2M 2480MHz Ant1 Emission



Conducted RF Spurious Emission

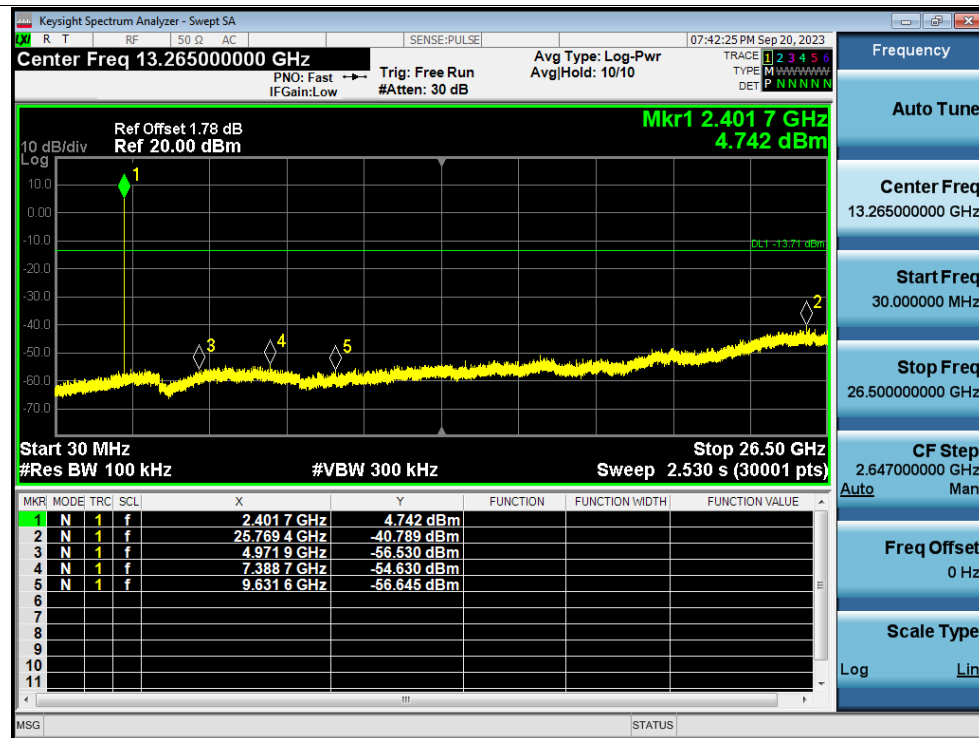
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-47.07	-20	Pass
NVNT	BLE 1M	2440	Ant1	-47.36	-20	Pass
NVNT	BLE 1M	2480	Ant1	-47.82	-20	Pass
NVNT	BLE 2M	2402	Ant1	-47.99	-20	Pass
NVNT	BLE 2M	2440	Ant1	-47	-20	Pass
NVNT	BLE 2M	2480	Ant1	-46.79	-20	Pass

Test Graphs

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



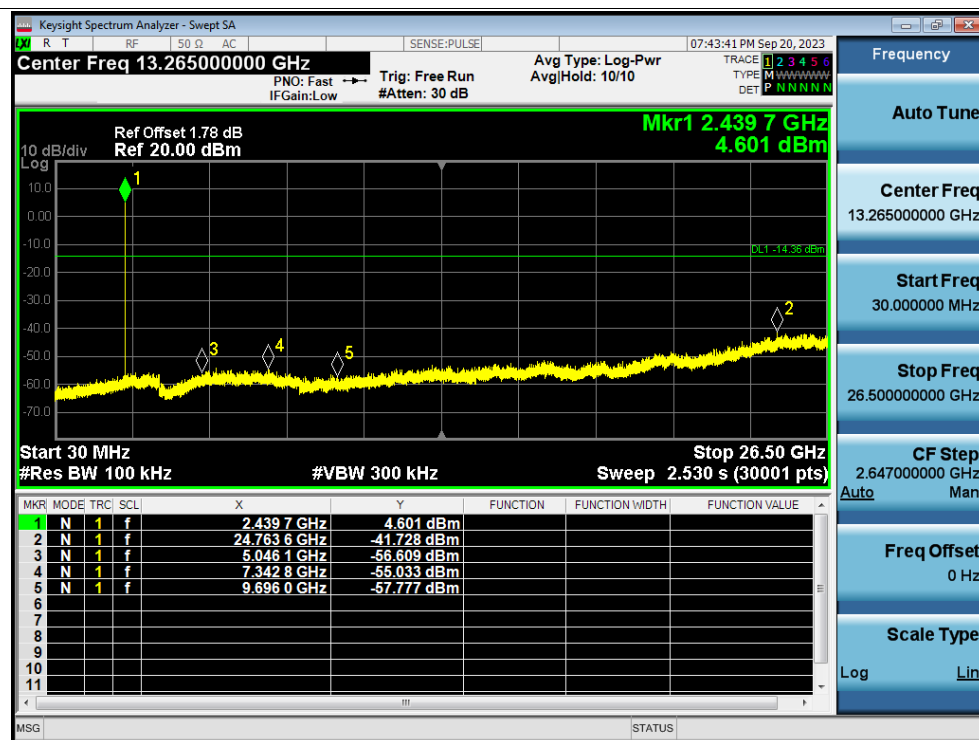
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission



Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref



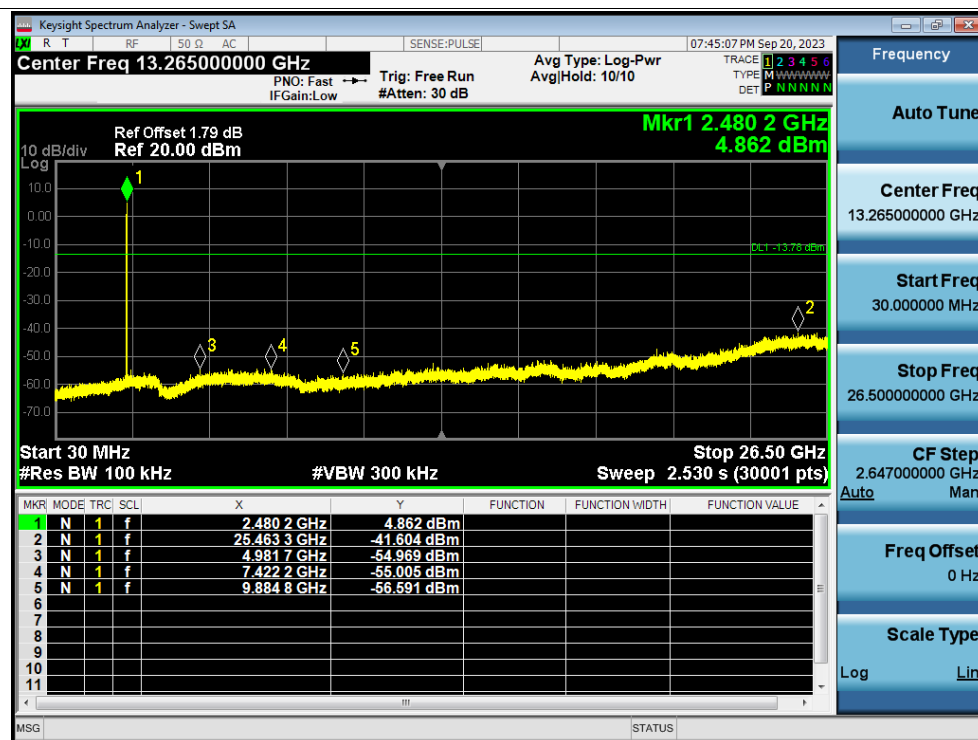
Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission



Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref



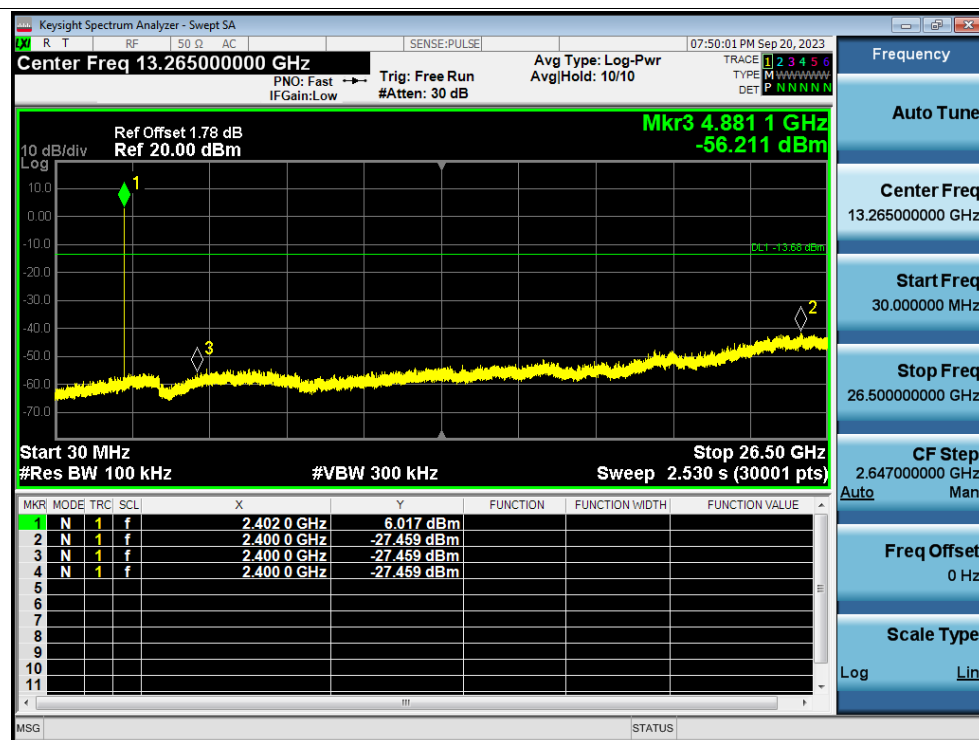
Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission



Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Ref



Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Emission



Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Ref

Keysight Spectrum Analyzer - Swept SA

Center Freq 2.44000000 GHz

Ref Offset 1.78 dB
Ref 20.00 dBm

10 dB/div
Log

Mkr1 2.440 018 GHz
5.744 dBm

Center 2.440000 GHz
#Res BW 100 kHz
#VBW 300 kHz

Span 3.000 MHz
Sweep 1.000 ms (1001 pts)

Frequency

Auto Tune

Center Freq
2.44000000 GHz

Start Freq
2.438500000 GHz

Stop Freq
2.441500000 GHz

CF Step
300.000 kHz
Man

Freq Offset
0 Hz

Scale Type
Log

Center Freq 13.26500000 GHz
PNO: Fast → **Trig:** Free Run
IF Gain: Low **#Atten:** 30 dB
Avg Type: Log-Pwr **Avg|Hold:** 10/10
TRACE 1 2 3 4 5 6
TYPE M W N N N N N
DET P N N N N N N

Ref Offset 1.78 dB
Ref 20.00 dBm
Mkr1 2.439 7 GHz
2.483 dBm

Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.530 s (30001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.439 7 GHz	-2.483 dBm			
2	N	1	f	25.505 6 GHz	-41.267 dBm			
3	N	1	f	5.001 1 GHz	-56.803 dBm			
4	N	1	f	7.483 1 GHz	-55.387 dBm			
5	N	1	f	9.679 2 GHz	-57.282 dBm			

Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Ref



Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Emission

